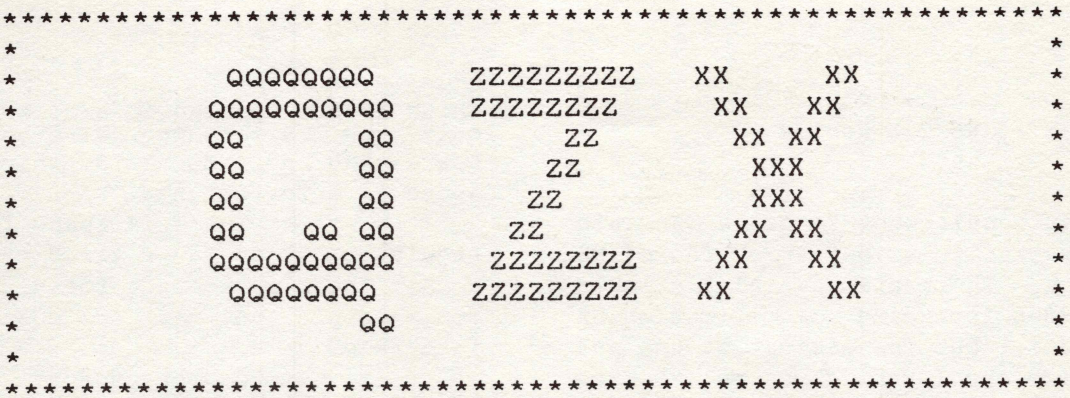

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K5XY
Alex. F. Burr
Publisher

W4GHV
Bo Barry
Editor

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Z-SI/O RS 232 Review
K5XY

The first requirement to get a Sinclair computer on packet is to get some kind of RS 232 interface. There are several available for the T/S 2068 including a modification of the Timex modem, but the easiest to use and most versatile one I know about is a nice compact board sold by Grey and Clifford Computer Products, Box 2186, Inglewood CA 90305 for $79 (plus shipping). This price is not particularly cheap as far as Sinclair accessories go, but you do get your money's worth.

It is certainly easy to install. I unrolled it from its thick plastic wrap, plugged it into the back of my T/S 2068 and hooked it up to my TNC. That was it. As soon as power was applied, it worked. All the little red and green LED's on my RS-232 break-out box took on the appropriate colors and I was in business. Nothing could be simpler.

Of course there are still questions. What is it like, can it be used for packet, is it really a RS-232 interface, will it keep working, is its operation flexible? There is no end of questions and I will answer only a few here.

What is it like? It is a small double sided printed circuit card a little bigger than 3 1/2 X 5 1/2. It has a standard 25 pin female DB25 output jack. The jack is a right angle type soldered and riveted to the board for stability. It has nuts for solidly holding cable plugs. It has a jack on the board which mates with the T/S 2068 accessory slot just like an external RAM box on the ZX type Sinclairs. This jack is mounted at just the right height so that the lower edge of the interface rests on your table top; making the arrangement mechanically stable. I have had no RAM wobble trouble. It provides a circuit board extension on the other side so that your printer or other equipment can still be attached. This last little piece of circuit board is well and solidly fixed to the main board so that again everything is mechanically stable.

The board itself is professionally made with plated through holes. The 12 volt regulator is the only one of the 10 IC's which is not mounted in a socket. There is only one little jumper wire soldered to the board and no components which have been added as afterthoughts.

In fact there is space for a 9 volt regulator which was revised out. In one corner there is a place for a 20 pin socket for people to use in customizing the interface.

Will it work on packet? This was the first question which entered my mind when I saw the unit in its clear plastic wrapper. It had no case and the data rate crystal near the top edge showed that there were RF circuits on the card. The interface was primarily designed for use with land line modems or printers where RF is no problem, but amateur radio is a little different. I have not made extensive RF checks, but I can say that I had absolutely no trouble with our RBBS stations and contacts on 145.01 MHz and no interference showed up on my channel 2 TV monitor screen.

Will it keep working? I think the answer is yes. First of all, it comes with a standard 90 day warranty. Second, and most important, it appears to be conservatively designed. I have had mine running for days at a time and nothing heats up.

I was just a little worried about the voltage regulator. The Sinclair computers do this to you with their heating problems. The interface takes its power from the T/S 2068 through the accessory bus. Now the T/S 2068 has a power supply rated at 15 volts 1 amp. When that supply is lightly loaded, as when running a bare computer, the voltage tends to soar above 20 volts. (See coming QZX article for details.) I need not have worried. The specifications for the unit says that it will accept any voltage between 15 and 24. Even after several days of continuous operation, the 7812 three terminal regulator was only pleasantly warm to the touch, and it was the hottest component on the board.

Is it really an RS-232 adapter? Because there is no good legal definition of a true RS-232 interface, a definitive answer cannot be given. But the short answer is yes.

The most important RS-232 characteristic is the signal voltages used. RS-232 voltages are supposed to alternate

between two bands above and below ground. This interface requires only a single positive voltage to run. Perhaps it has only a pseudo RS-232 output like the Commodore 64 (which only outputs positive voltages). But some quick measurements showed that the outputs are true RS-232. The high voltage is above +10 V and the lows are below -10 V. The interface gets its negative voltage from a 555 oscillator.

The interface makes your computer into Data Terminal Equipment (DTE) which is very convenient for packet use because TNC's are configured as Data Communication Equipment (DCE). The easiest way of learning that the interface is DTE (despite its female connector) is to read the technical manual. The most unambiguous way is to measure the voltage on pin 2 (TD, Transmit Data). When nothing is being sent, that voltage is -11 V indicating an active output in the MARK state as it should be for a DTE device not sending data. As befits a DTE, the lines for RTS (Request To Send, pin 4) and DTR (Data Terminal Ready, pin 20) are asserted or raised to +11 V. There are five other pins in the DB-25 socket which are connected. Pins 1 and 7 are grounded and three other pins are waiting for signals to come from the DCE (the TNC in our case). These three pins are RD (Receive Data, pin 3), CTS (Clear To Send, pin 5), and DSR (Date Set Ready, pin 6).

This interface comes in three varieties. The standard model was tested here. There are other models for use by those systems which use the JLO or AERCO disk drives. The only difference between the interfaces is the port addresses from which the interface obtains its data and control signals.

A good technical manual and user's guide accompanies the interface. It is about 40 pages long including a software development supplement and complete schematics. Also included are complete data sheets on the 8251, which is the UART that is the heart of the interface. The manual concludes with a few pages of useful reference data including some information on synchronous data transmission of the type used by the TNC.

Of course a RS-232 interface just by itself is of little use. There has to be some software to drive it. The manual gives enough code in machine language and in BASIC to get you started. The supplement actually has some complete printer drivers and a terminal emulator in assembly language that will work. A review of a complete terminal program that makes this interface work on packet is given elsewhere in this issue.

In summary it will be hard to find a better RS-232 interface for the T/S 2068.

SPECTERM-64, A Terminal Program Review

K5XY

This review is another review of the products which make possible the easy interfacing of a T/S 2068 to a TNC for use on packet radio. Another article reviewed the fine RS-232 interface which just needs plugging into the back of our computer to be ready to work. This one reviews an easy-to-use software program which controls the RS 232 interface and makes the whole thing work.

Specterm-64 (TS 4.1) is based on a British program specially modified to run on the T/S 2068 in the US computing environment. There is a version which will run on the Spectrum too. I really should not have mentioned the Spectrum here, because every time I read Specterm-64 my brain registers Spectrum-64 and I wonder if it will work on the T/S 2068. Have no fear. Even if there is only one letter difference, Specterm-64 runs well on the T/S 2068.

Specterm-64 is sold by Grey and Clifford Computer Products, Box 2186, Inglewood CA 90305 for $30.00. It comes on a high quality cassette and with a complete 15 page manual which has step-by-step instructions on how to get it running.

This program was not designed with packet in mind. (One of its big selling points is that it supports XMODEM file transfers which, of course, is not useful on packet.) It does feature 64 column display, UPPER/lower case with the CAPS-LOCK key, 31+ K buffer capacity, 300/1200 Baud capability, and full screen color control.

It also is a program which has a large amount of flexibility built in. It is easy to create customized local control menus (the reverse side of the tape has several). There is a 7 K area in the program into

which you can place your own BASIC routines. The program is designed much like the MODEM7xx programs for CP/M machines. There is the basic program and separate overlay programs for different computers. The tape received contains the main program and three different overlays for different types of RS 232 interfaces. I, of course, used the tsz overlay for the Z-SI/O RS-232 interface reviewed last month. Of great importance to many of our readers is the fact that, while the program is flexible, it will work right out of the box and no changes need be made.

User support for this program is unusually good. The telephone number of the developers is given in the user's guide. There is even a BBS with lots of information. The BBS is the TIME-=<X>=-CHANGE BBS at (213) 329-3922. It contains files of Local Control Menus, BASIC utilities, and interface overlays that can be downloaded free of charge. Specterm-64 public domain files and on-line support are available on the BBS 24 hours a day.

The program files are each recorded twice on a quality cassette tape. Side A contains the Specterm-64 Overlay Loader, SPTERM machine code file, and several interface files. Side B contains additional versions of the Local Control Menu.

Detailed instructions are given for loading the program. Once I got the volume of my tape recorder adjusted correctly, it loaded the first time. First you command the computer to LOAD ". When done successfully, and it does not take long, the computer beeps at you and requests you to stop the tape recorder. You are then offered a choice of overlays to load. Select the one called tsz. When the next two files are successfully loaded, a Local Control Menu will automatically appear on the screen. You will be offered four choices. You should select the third one by typing 3 and hitting the ENTER key. You will be returned to BASIC. Turn the tape over. Now load a new, more appropriate Local Control Menu by typing LOAD LOADER. (note: LOADER must be in CAPS), starting the tape recorder and hitting ENTER. In a short time the computer will announce a successful load. Type GOTO 1500 to enter the program and bring up the new Local Control Menu.

This new Local Control Menu will allow you to set the data rate used to communicate with your TNC. I suggest you start with choice 2 which gives you 300 Baud, 7 bit words, even parity, and one stop bit.

At this point it would be wise to return to BASIC (choice 3) and save the program with your customized menu and data rate. A save is accomplished by typing GOTO 1000.

Now return to the Local Control Menu (GOTO 1500) and select choice 1 (enter specterm).A screen of information about the program appears. To start the program, just press ENTER and you are connected to your TNC through the Z-SI/O interface.

That's all. You are in the packet business. Run your TNC as you wish. Happy packeting.

Well, that is not really all. It did work like that for me and right away too, but there are some peculiarities, some caused by the computer and some caused by the software, that have to be worked around. There are some distinct pleasures which should be commented on too.

The first of these points is the 64 column display. Up until I got this combination working I had been using a T/S 1500. It worked well with the Comlink I interface, but the keyboard, while better than the ZX81, was giving me trouble. The computer is well used and the space key and shift key keep sticking on me. Therefore I was looking forward to using the T/S 2068 keyboard. I was pleasantly surprised at the improvement made by the 64 character display. Now when listing the latest messages from the RBBS, all parts of the headers fall under the correct heading instead of overflowing to the next line as with the 32 column display. This makes it much easier to pick out messages to ALL from the messages to specific stations. It is also easier to spot the message length. There is, unfortunately, a high price (about $80) to be paid for this improvement. The band width required for the 64 character line was too much for the cheap TV set which I was using with the T/S 1500. The smaller letters just could not be made clear enough for them to be read. A TV set with a little better bandwidth than mine might make it, but I had to go to an inexpensive monitor (hence the $80). I have not yet been able to discover how to turn off the 64 character display for the terminal program.

The next big improvement was in the screen display. This combination will print lower case letters if they are sent to you. The T/S 1500 (really the Comlink interface) translated them all to upper case. Now it was much easier to spot the words sent to me, which usually appear in lower case, from my words going out through the TNC, which are in UPPER case. It did not take me long to figure out how I could send lower case letters if I wanted to. Just hit the CAPS LOCK key (CAPS SHIFT + 2). The software does not send that combination but uses it to unlock the caps shift key which was locked when the program was initialized. It is worth noting that all software commands to the program must be in CAPS so I usually leave the lock on.

The next item noticed was the operation of the cursor. It two-steps. That is, when a key is pressed, the cursor does not move to the next position. Instead the key pressed appears in the cursor in reverse video. When the next key is pressed, the cursor moves two spaces to the right and the last two characters entered now appear to the left of the cursor in normal video. This oddity is not much of a disadvantage except for certain times when the space bar is pressed. If that key press is not the one that causes the cursor to move, it seems as if nothing has happened (because a space cannot appear in reverse video). But when the next key is pressed, the space appears as it should. I think this oddity is connected with the fact that the UART used in the serial interface has a two character buffer and I was using the normal full duplex (echo) mode.

The biggest limitation the T/S 2068 has as far as packet is concerned is the lack of a control key to send control characters. It is very difficult to operate packet without control characters. The solution to this problem alone makes this software worth its price. The software has a special command which allows the control characters to be sent. You enter the command mode (of the software, not the TNC) by pressing EDIT (CAPS SHIFT + 1). A command prompt line then appears across the top of your screen without disturbing the TNC. Press C (for control). Now the next key pressed will send the appropriate control character. For example if G were pressed a BEL would be sent (and echoed back to you as a BEEP). The control characters with numbers 27 to 31 are sent by number keys. (The manual is a little unclear as to just which number key sends character 31, but I think it is 0.) As soon as the desired control key is sent, you are returned to terminal mode. It is particularly easy to return the TNC to command mode from converse mode. Just hit EDIT then C twice in rapid succession. The CMD: prompt immediately appears on your screen. Here the EDIT caused the software to enter the command mode (of the software), the first C told the software to prepare to send a control character and the second C sent a ^C to the TNC, all in a time much faster then it took to write it down.

I have not yet figured out the way the software handles ^S (X-OFF). It does not turn my TNC off like I think it should. However I can easily get the software to make the TNC stop when I want it to so I have not spent much time on this problem. All you have to do is hit EDIT. The software command prompts appear at the top of the screen and the TNC stops sending characters to the T/S 2068. I then read the screen at leisure and when I want the TNC to resume sending, I hit ENTER which returns the software to terminal mode and caused the TNC to send from where it left off. Well almost from where it left off. You loose one or two characters, probably in the UART buffer.

There is another oddity when you return to terminal mode after using BASIC. The TNC will not talk to the T/S 2068 until an X-ON has been given it. The quickest way to do this is to hit EDIT followed by ENTER. THis sequence causes an X-ON to be sent the TNC under normal conditions. Of course instead of the ENTER you could hit a C followed by Q to explicitly send ^Q, the default X-ON in the TNC.

I was trying to download a file from the local RBBS, which is based on an MS-DOS machine, when I ran into another quirk. To download the file I had to specify the complete path name of the file. This action requires a \ (back slash). Fortunately the T/S 2068 possesses a \. (It is under the D key.) But I have not been able to find a way to reach that symbol from the terminal mode of the software. (It requires a symbol shift key press).

I have a lot to learn yet about using other data rates and word length combinations with the TNC. I have not yet gotten 8 bit words working nor have I tried 1200 Baud. (I can just bearly read the screen fast enough at 300 Baud.) One consequence of this lack of experience is that I have not been able to use the buffer to capture a QSO for later study. Well, I did capture the QSO all right. It was actually easy. There is a command which allows it to be done with the capture process easily turned on or off. But one has to end the contents of the buffer with a non-ASCII character and I have not come up with a way to do this yet. The result is that, when you play back the buffer, the software does not know where the contents end so it waits forever for the end to come. (I had to reset the computer.)

The manual has enough detail written on an understandable level so that anybody can successfully use this software. It is well printed on three hole paper. Occasionally a word is missing or a sentence is a bit scrambled so that one is a bit uncertain as to the meaning but no serious difficulties arise from these typos.

In short, Specterm-64 with the Z-SI/O RS-232 interface is the fastest and best way that I know of to get the T/S 2068 on packet.

QZX Index and Reprint Book
K5XY

Many subscribers have asked about an index to the QZX articles. Bo and I have not had time to create one, but finally we at least have done something about it. A QZX index book is now published. The book is not a real index, but it does list all the articles and the issue in which the article appears. The book was created by xeroxing all the front covers of QZX since Bo and I took it over in December 1982. These cover copies are bound into a book of about 60 pages. For subscribers, the price is $5.00 plus $1.00 ($2.00 for non US addresses) for shipping and handling. Send a check to QZX, 2025 O'Donnell, Las Cruces, NM 88001. Do it now before the few copies we have are all gone.

Bo and I would like to issue a reprint book containing the most popular articles. But some of the early programs are so hard to read that they will not take another reprinting. It would help a lot if somebody would volunteer to retype these programs, check that they run, and send us a clear listing for reprinting. If anybody would like to do this, please write. If anybody would like to create a real index, we would be happy to hear from you too. It would be a good job for Vu-Calc, a simple basic program, or Arkive.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

WANTED: Copy of Z-XLR8 program (high speed) with instructions. In return I will send a cassette with DXCC-ROTATOR CONTROL, CAT, SCANNER AND TERMINAL (all programs for the interface given in my articles in QZX). Send to Guillermo Garcia, LU8MAD, Cabildo 584, (5521) Mendoza, ARGENTINA.

FOR SALE: Index to QZX consisting of a bound book of xerox copies of all the covers since December 1982. Send $5.00 plus $1.00 shipping and handling ($2.00 if to a non-US address) to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

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* You Must ACT NOW!!! *

FIELD DAY LOG and DUPE PROGRAM

for the Sinclair ZX81 and Timex 1000 series computers and printers

Copyright 1982 by
BOB O'LEARY, KQ2F

YES! Your Little Sinclair/Timex CAN DO IT with this program!

* PROVEN UNDER FIELD CONDITIONS
* 24 HOUR OPERATION IN 1982 & 1983
* COMPUTER RUNS ON 9-11VDC BATTERY POWER
* FAST! CHECKS DUPE IN A FEW SECONDS
* STORE 950 CALLS WITH 16K RAM
* LOG AND DUPE SHEET OUTPUT TO PRINTER
* ACCEPTABLE TO A.R.R.L. FOR CONTEST ENTRY
* GET THE COMPETITIVE EDGE, AND HAVE MORE FUN DOING IT!

You will need a ZX81, TS1000, or TS1500 with at least 16K RAM and a Sinclair or Timex printer. Initial load time is 2 1/2 minutes. The program is self-starting, but when you first load it for operation do not answer the prompt. You must hit ENTER, and an error code will stop program execution. Then hit RUN ENTER. This is necessary to dimension the memory to accept calls. Thereafter, just follow the prompts. With 16K RAM you can store up to 95 calls per call area.

The program is almost fool-proof. It even checks your typing. Anyone who can hunt and peck will enjoy logging for you. Try it! Enter a call. If you make a mistake it will tell you what's wrong and ask you to try again.

Answer the prompts for log information. If you want to cancel the entry, just hit ENTER. However, once you enter the time the contact is logged and printed to the printer. The printed log is your permanent record. Make sure the printer is turned on.

The only information that is actually stored in memory is the callsign and time, for duping purposes. The memory should definately be dumped to cassette at the end of the contest and prior to printing the dupe sheet. Do this by entering the word TAPE instead of a callsign. Then follow the prompts. Save 2 copies if possible.

Printing the dupe sheet must be the very last operation, because it reorganizes the memory and stops program execution when completed. Do this by entering the word DUPE instead of a callsign. Then follow the prompts. Make photocopies of the log and dupe sheets, as the thermal print-outs do not last.

If the program stops operation for no apparent reason (this is very rare) and an error code appears, enter GOTO 190 to get going again. DO NOT USE A RUN COMMAND or your memory will be cleared.

The computer will need an uninterupted power source to maintain it's memory for duping. This can be 9-11VDC rechargeable batteries. Everything else can be run off the generator, but make sure the AC frequency and voltage are proper. Run the cassette recorder off batteries to minimize variations in speed.

WARNING! PORTABLE OPERATION ALWAYS INVOLVES CERTAIN RISKS, AND I MAKE NO WARRANTEE AS TO ANY DAMAGES THAT YOU MAY INCUR. With proper care you should have no problems.

95 calls per call area will be adequate for most of you, but our operations have sometimes yielded up to 200 calls in some call areas, depending on the band. Therefore, we use an extra RAM Pack. There is a variable located at line 90 in the program that can be changed to accomodate this. If you have more than 16K RAM then you know that you must also change RAMTOP with some POKE commands, as follows:

TS1500 with extra 16K RAM Pack - POKE 16388,0 ENTER POKE 16389,192 ENTER NEW then load the program and EDIT line 90 to read: 90 LET W=250 to get up to 250 calls per call area.

If you have 64K expansion - POKE 16388,255 ENTER POKE 16389,255 ENTER NEW then load the program and EDIT line 90 to read: 90 LET W=400 to get up to 400 calls per call area.

Computerized Field Day operation has been alot of fun and has given us a competitive edge. With proper preparation and care I know you will enjoy it also. -73-

```
   5 REM TSFD1.9    LOG AND DUPE
     FOR SINCLAIR/TIMEX PRINTER
  10 REM
  20 REM COPYRIGHT 1982 BY
  30 REM ROBERT A. O LEARY, KQ2F
  40 REM 21 KATE TERRACE
  50 REM PISCATAWAY, N.J.  08854
  70 LET U=7500
  80 LET D=1
  90 LET W=95
 100 DIM A$(10,W,10)
 110 DIM A(10)
 120 DIM S$(6)
 130 DIM C$(6)
 140 DIM R$(7)
 150 DIM J$(7)
 160 DIM T$(4)
 190 PRINT AT 0,0;" [illegible] "
[illegible]
 200 REM INPUT CALL, CHECK FORM
 220 PRINT AT 21,8;"ENTER A CALL
, MEAT-HEAD."
 230 GOTO 280
 260 PRINT AT 21,8;"TRY AGAIN, D
UMMY."
 280 SLOW
 285 INPUT Z$
 300 IF LEN Z$<4 THEN GOTO 7100
 305 IF LEN Z$>6 THEN GOTO 7150
 310 IF Z$="DUPE" THEN GOTO 1400
 320 IF Z$="TAPE" THEN GOTO 8800
 330 FOR N=1 TO LEN Z$
 340 LET B=CODE Z$(N)
 345 IF B<28 OR B>63 THEN GOTO 7
200
 350 NEXT N
 360 FOR N=2 TO 3
 365 LET B=CODE Z$(N)
 370 IF B<38 THEN GOTO 400
 380 NEXT N
 390 GOTO 7300
 400 REM SORT CALL AREAS
 405 FAST
 410 LET C=VAL CHR$ B
 420 IF C=0 THEN LET C=10
 430 IF A(C)=0 THEN LET A(C)=1
 500 LET S$=Z$
 600 LET A$(C,A(C), TO 6)=S$
 630 GOTO 5000
1400 REM PRINT DUPE SHEET TITLE
1405 CLS
1410 LET P$=" [illegible] "
1420 PRINT P$
1430 PRINT ,,"THIS ROUTINE PRINT
S A DUPE SHEET"
1440 PRINT "THAT IS SUITABLE FOR
 CONTEST     ENTRY TO THE A.R.R.L
."
1450 PRINT ,,"THIS PROCESS TAKES
 SOME TIME,"
1455 PRINT "DURING WHICH THE SCR
EEN WILL GO BLANK."
1460 PRINT ,,"YOU CANNOT CONTINU
E LOGGING      AFTER RUNNING THIS
 ROUTINE."
1465 PRINT ,,,,,,
1470 GOTO 8810
1480 PRINT ,,," OR JUST HIT ENTER
 TO PRINT THE  DUPE SHEET..."
1490 GOTO 8920
1500 REM INCREMENT DUPE SHEET
1510 FAST
1550 FOR N=1 TO 10
1580 LET E=A(N)-1
1590 IF E<=0 THEN GOTO 1950
1600 REM ALPHABETIZE
1610 FOR K=1 TO E
1620 FOR J=1 TO E+1-K
1630 IF A$(N,J)<=A$(N,J+1) THEN
GOTO 1700
1640 LET Y$=A$(N,J)
1650 LET A$(N,J)=A$(N,J+1)
1660 LET A$(N,J+1)=Y$
1700 NEXT J
1710 NEXT K
1800 REM PRINT DUPE SHEET
1810 LET P$="     [illegible]
 [illegible] "
1820 LPRINT P$
1850 LET H=(E+1)/2
1860 FOR I=1 TO INT (H+.5)
1870 LET P$="    "+A$(N,I, TO 6)
+"  "+A$(N,I,7 TO )+"        "+A$(N
,H+I, TO 6)+"  "+A$(N,H+I,7 TO )
1880 LPRINT P$
1890 NEXT I
1920 LET P$=" "
1940 LPRINT P$
1950 NEXT N
1960 STOP
2000 REM INCREMENT LOG
2010 LET A(C)=A(C)+1
2020 LET D=D+1
2050 GOTO 190
4000 GOSUB U
4010 PRINT AT 17,1;S$
4200 GOSUB 7700
4205 LET C$=S$
4207 SLOW
4210 INPUT R$
4220 IF R$="       " THEN GOTO 5
000
4230 PRINT AT 17,9;R$
4300 GOSUB 7800
4310 INPUT J$
4320 IF J$="       " THEN GOTO 5
000
4330 PRINT AT 17,13;J$
4400 GOSUB 7900
4410 INPUT T$
4412 IF LEN T$>4 THEN GOTO 4410
4415 IF T$="    " THEN GOTO 5000
4420 FOR N=1 TO LEN T$
4430 LET B=CODE T$(N)
4440 IF B<28 OR B>37 THEN GOTO 4
410
4450 NEXT N
4490 IF VAL T$>2400 THEN GOTO 44
10
4500 FAST
4600 LET A$(C,A(C),7 TO )=T$
4650 PRINT AT 17,27;T$
4700 GOTO 8300
5000 REM CANCEL PRESENT ENTRY
5010 GOSUB U
5020 PRINT AT 17,9;"NOT LOGGED
"
5030 SCROLL
5040 PRINT AT 21,31;AT 21,0;
5060 PRINT AT 19,0;"DIDNT WORK H
IM AFTER ALL...        EH, HOT-S
HOT?"
5070 GOTO 190
5100 REM PRINT CANCEL PROMPT
5110 PRINT AT 21,0;" OR JUST HIT
 ENTER TO CANCEL."
5120 RETURN
5800 REM DISPLAY TOTALS
5810 SCROLL
5820 PRINT AT 21,31;AT 21,0;
5900 LET X=C
5910 IF X=10 THEN LET X=0
5920 GOSUB 7500
5950 PRINT AT 19,0;D;" CONTACTS
FOR ";D*2;" POINTS;"
5960 PRINT AT 20,0;A(C);" CALLS
IN THE ";X;" AREA.  BIG "
5965 PRINT AT 21,0;"DEAL..."
5970 GOTO 2010
5990 REM SEARCH FOR DUPE
6000 FOR X=1 TO A(C)-1
6010 IF A$(C,X, TO 6)=S$ THEN GO
TO 7000
6020 NEXT X
6030 GOTO 4000
```

```
7000 GOSUB U
7010 LET K$=A$(C,X,7 TO )
7020 PRINT AT 19,0;"▓▓▓▓▓▓▓▓▓ ";S$
;" IS A DUPE▓▓▓▓▓▓▓▓▓"
7030 PRINT AT 20,1;"YOU WORKED "
;S$;" AT ";K$;" UTC."
7040 PRINT AT 21,3;"KISS MY I/O
AND TRY AGAIN."
7050 GOTO 280
7100 GOSUB U
7110 PRINT AT 20,0;"▓HEY STUPID.
 """;Z$;"""  IS TOO SHORT▓"
7120 GOTO 260
7150 GOSUB U
7160 IF LEN Z$>10 THEN PRINT AT
20,4;"...UP YOUR NOSE, DOG BREAT
H."
7165 IF LEN Z$>10 THEN GOTO 260
7170 PRINT AT 19,0;"▓"""";Z$;"""
IS TOO LONG▓"
7180 PRINT AT 20,8;"ARE YOU DRUN
K?"
7190 GOTO 260
7200 GOSUB U
7210 PRINT AT 19,0;"▓YOU TYPED "
"";Z$;""" , BIRD BRAIN▓"
7220 PRINT AT 20,2;"USE LETTERS
AND NUMBERS ONLY."
7230 GOTO 260
7300 GOSUB U
7310 PRINT AT 19,0;"▓""";Z$;"""
2ND OR 3RD CHARACTER"
7320 PRINT AT 20,1;"ISNT A NUMBE
R...BUTTER FINGERS▓"
7330 GOTO 260
7500 PRINT AT 19,0;"
                    "
7510 PRINT AT 20,0;"
                    "
7520 PRINT AT 21,0;"
                    "
7550 RETURN
7700 GOSUB U
7710 PRINT AT 20,0;"▓ENTER THE ▓
▓▓▓▓▓ HOCKEY PUCK..."
7715 GOTO 5100
7800 GOSUB U
7810 PRINT AT 20,1;"▓NOW THE ▓▓▓
▓▓▓▓ BANANA HEAD..."
7815 GOTO 5100
7900 GOSUB U
7910 PRINT AT 20,2 "▓▓▓▓ ? 4 NUM
ERALS, EINSTEIN...
7915 GOTO 5100
8000 REM PRINTER ROUTINES
8300 LET P$=" "+C$+"  "+R$+"  "+
J$+"  "+T$
8310 LPRINT P$
8330 GOTO 5800
8800 CLS
8810 PRINT "CHANGE YOUR MIND, GE
NIUS?  THEN "
8820 PRINT "ENTER ""1"" TO CONTI
NUE LOGGING..."
8825 IF Z$="DUPE" THEN GOTO 1480
8830 LET P$=" ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓
▓▓▓▓▓▓▓▓ "
8840 PRINT AT 4,0;P$
8845 LET W1=INT ((W*100)/2250+2.
5)
8850 PRINT , ,"THE FOLLOWING TAKE
S ABOUT ";W1
8860 PRINT "MINUTES TO FINISH RE
CORDING."
8880 PRINT , ,"1) PRESS ""RECORD/
PLAY"" BUTTONS"
8890 PRINT "    SO AS TO START RE
CORDING."
8910 PRINT , ,"2) ENTER ANY KEY A
ND THEN WAIT."
8920 INPUT W$
8925 IF LEN W$>1 THEN GOTO 8920
8930 IF CODE W$=29 THEN GOTO 901
0
8950 LPRINT P$
8960 IF Z$="DUPE" THEN GOTO 1500
8970 PAUSE 60
9000 SAVE "TSFD1.▓"
9010 CLS
9020 LET P$=" ▓▓▓▓▓▓▓▓ ▓▓▓▓▓▓▓▓ ▓
▓▓▓▓▓▓▓▓ ▓▓▓▓▓▓▓▓ "
9030 LPRINT P$
9040 GOTO 190
```


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